

## CLAIMS

1. A polymerization-inhibiting composition comprising at least one compound (a) selected from the group consisting of a compound having an NO radical in its molecule and a precursor compound capable of forming an NO radical, a phosphorus-containing compound (b), and at least one monomer (c) selected from the group consisting of a conjugated diene, an aromatic vinyl, an ethylenically unsaturated nitrile and an  $\alpha$ -olefin, wherein a weight ratio of the compound (a) to the phosphorus-containing compound (b) is 1:10 to 100:1.

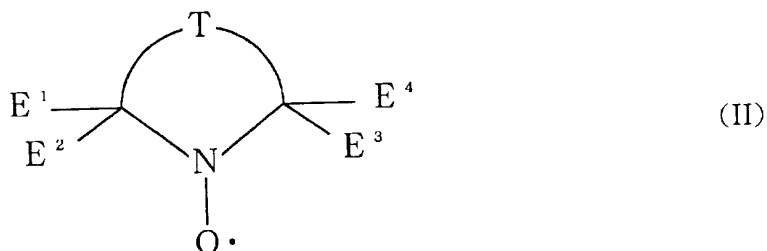
2. The polymerization-inhibiting composition according to Claim 1, wherein the compound (a) is at least one compound selected from the group consisting of an N,N-dialkylhydroxylamine, a sterically hindered nitroxyl compound and a sterically hindered hydroxylamine compound.

3. The polymerization-inhibiting composition according to Claim 2, wherein the N,N-dialkylhydroxylamine is a compound represented by the formula (I):

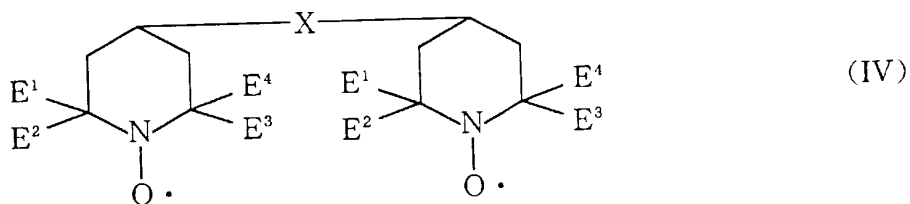


wherein  $R_1$  and  $R_2$  are independently a linear, branched or cyclic alkyl group having 1 to 10 carbon atoms.

4. The polymerization-inhibiting composition according to Claim 2, wherein the sterically hindered nitroxyl compound is a compound represented by the formula (II):

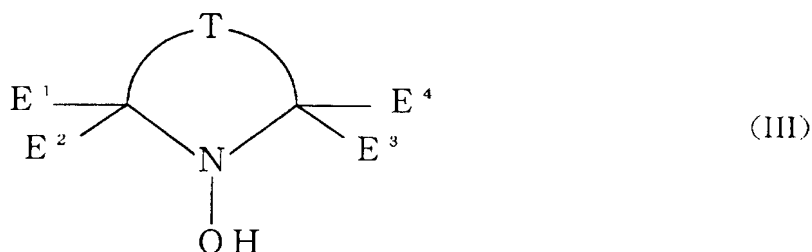


5 wherein the nitrogen atom is bonded directly to 2 tetrasubstituted carbon atoms, E<sub>1</sub>, E<sub>2</sub>, E<sub>3</sub> and E<sub>4</sub> are independently an organic group, and T is an organic group required to form a 5- or 6-membered ring, or a compound  
10 represented by the formula (IV):

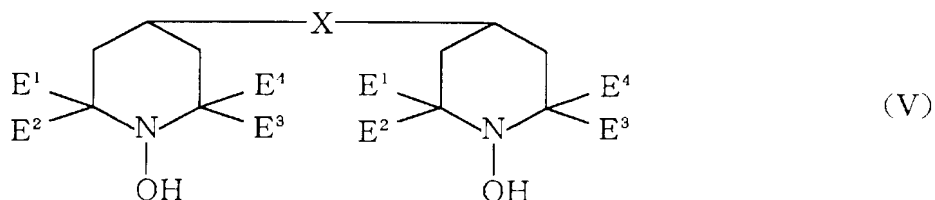


wherein the nitrogen atom is bonded directly to 2 tetrasubstituted carbon atoms, E<sub>1</sub>, E<sub>2</sub>, E<sub>3</sub> and E<sub>4</sub> are independently an organic group, and X is a divalent  
15 linking group.

5. The polymerization-inhibiting composition according to Claim 2, wherein the sterically hindered hydroxylamine compound is a compound represented by the  
20 formula (III):



wherein the nitrogen atom is bonded directly to 2  
 tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are  
 independently an organic group, and T is an organic group  
 5 required to form a 5- or 6-membered ring, or a compound  
 represented by the formula (V):



wherein the nitrogen atom is bonded directly to 2  
 tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are  
 10 independently an organic group, and X is a divalent  
 linking group.

6. The polymerization-inhibiting composition  
 according to Claim 1, wherein the phosphorus-containing  
 15 compound (b) is at least one selected from the group  
 consisting of phosphoric compounds, esterified products of  
 the phosphoric compounds, alkali metal salts or ammonium  
 salts of the phosphoric compounds, compounds obtained by  
 introducing an ester linkage and an alkali metal salt

linkage or an ammonium salt linkage into the phosphoric compounds, phosphine compounds, and hexaalkylphosphorus triamides.

5           7. The polymerization-inhibiting composition according to Claim 1, wherein the monomer (c) is a conjugated diene.

10           8. A polymerization inhibitor for at least one monomer (c) selected from the group consisting of a conjugated diene, an aromatic vinyl, an ethylenically unsaturated nitrile and an  $\alpha$ -olefin, comprising at least one compound (a) selected from the group consisting of a compound having an NO radical in its molecule and a precursor compound capable of forming an NO radical, and a  
15           phosphorus-containing compound (b), wherein a weight ratio of the compound (a) to the phosphorus-containing compound (b) is 1:10 to 100:1.

20           9. The polymerization inhibitor according to Claim 8, wherein the compound (a) is at least one compound selected from the group consisting of an N,N-dialkylhydroxylamine, a sterically hindered nitroxyl compound and a sterically hindered hydroxylamine compound.

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          10. The polymerization inhibitor according to Claim 9, wherein the N,N-dialkylhydroxylamine is a compound

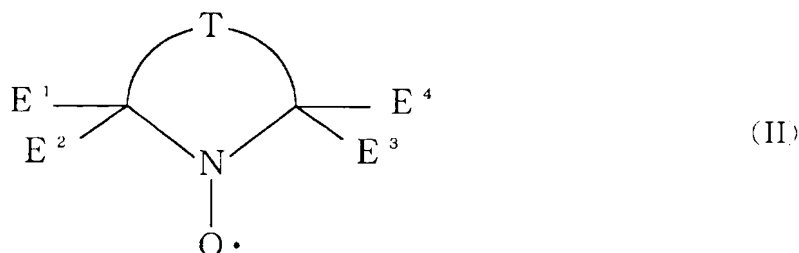
represented by the formula (I):



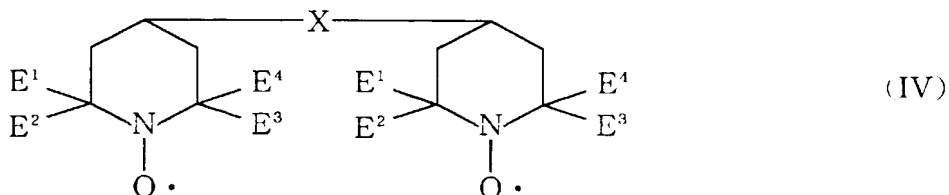
wherein  $R_1$  and  $R_2$  are independently a linear, branched or cyclic alkyl group having 1 to 10 carbon atoms.

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11. The polymerization inhibitor according to Claim 9, wherein the sterically hindered nitroxyl compound is a compound represented by the formula (II):



10 wherein the nitrogen atom is bonded directly to 2 tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are independently an organic group, and T is an organic group required to form a 5- or 6-membered ring, or a compound represented by the formula (IV):

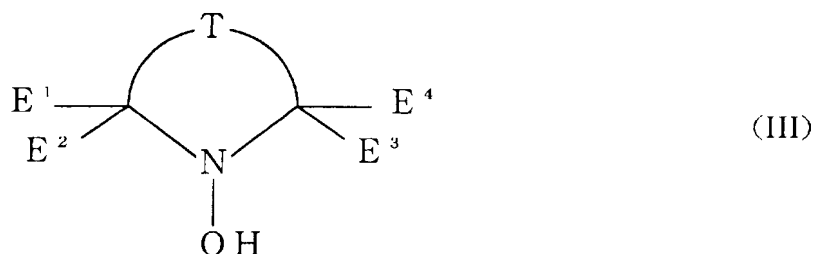


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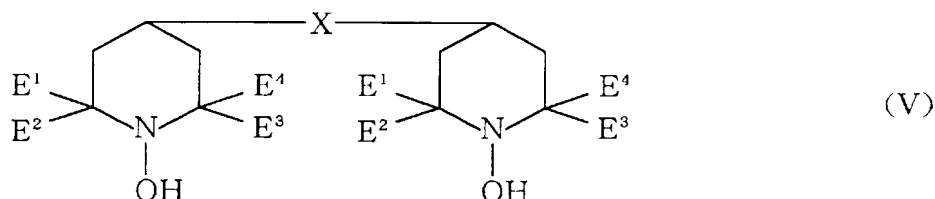
wherein the nitrogen atom is bonded directly to 2 tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are independently an organic group, and X is a divalent

linking group.

12. The polymerization inhibitor according to Claim 9,  
wherein the sterically hindered hydroxylamine compound is  
5 a compound represented by the formula (III):



- wherein the nitrogen atom is bonded directly to 2  
tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are  
independently an organic group, and T is an organic group  
10 required to form a 5- or 6-membered ring, or a compound  
represented by the formula (V):



- wherein the nitrogen atom is bonded directly to 2  
tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are  
15 independently an organic group, and X is a divalent  
linking group.

13. The polymerization inhibitor according to Claim 8,  
wherein the phosphorus-containing compound (b) is at least

one selected from the group consisting of phosphoric compounds, esterified products of the phosphoric compounds, alkali metal salts or ammonium salts of the phosphoric compounds, compounds obtained by introducing an ester linkage and an alkali metal salt linkage or an ammonium salt linkage into the phosphoric compounds, phosphine compounds, and hexaalkylphosphorus triamides.

14. The polymerization inhibitor according to Claim 8, wherein the monomer (c) is a conjugated diene.

15. A method for inhibiting polymerization, which comprises causing at least one compound (a) selected from the group consisting of a compound having an NO radical in its molecule and a precursor compound capable of forming an NO radical, and a phosphorus-containing compound (b) to coexist at a weight ratio of the compound (a) to the phosphorus-containing compound (b) of 1:10 to 100:1 with at least one monomer (c) selected from the group consisting of a conjugated diene, an aromatic vinyl, an ethylenically unsaturated nitrile and an  $\alpha$ -olefin.

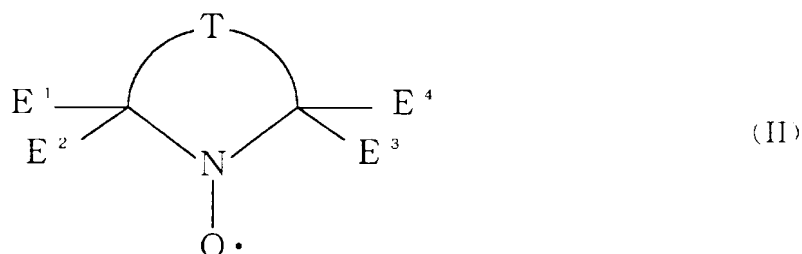
16. The polymerization-inhibiting method according to Claim 15, wherein the compound (a) is at least one compound selected from the group consisting of an N,N-dialkylhydroxylamine, a sterically hindered nitroxyl compound and a sterically hindered hydroxylamine compound.

17. The polymerization-inhibiting method according to Claim 16, wherein the N,N-dialkylhydroxylamine is a compound represented by the formula (I):

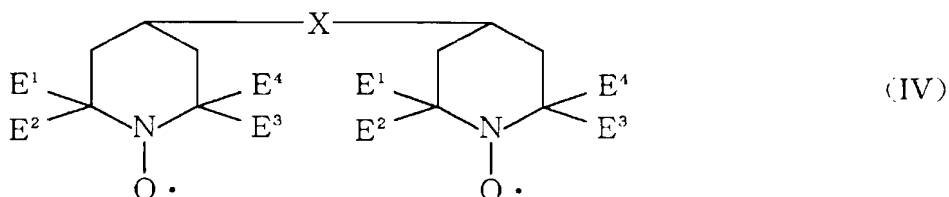


5 wherein  $R_1$  and  $R_2$  are independently a linear, branched or cyclic alkyl group having 1 to 10 carbon atoms.

18. The polymerization-inhibiting method according to Claim 16, wherein the sterically hindered nitroxyl  
10 compound is a compound represented by the formula (II):



wherein the nitrogen atom is bonded directly to 2 tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are independently an organic group, and T is an organic group  
15 required to form a 5- or 6-membered ring, or a compound represented by the formula (IV):

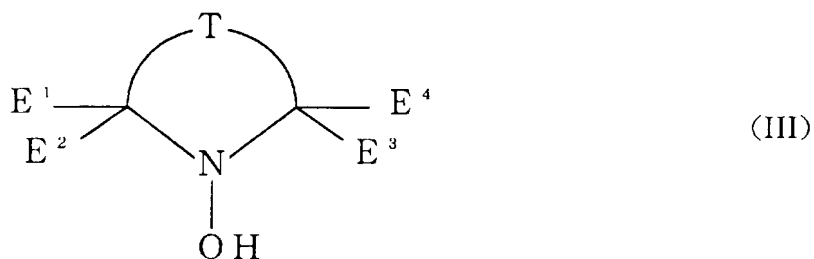


wherein the nitrogen atom is bonded directly to 2

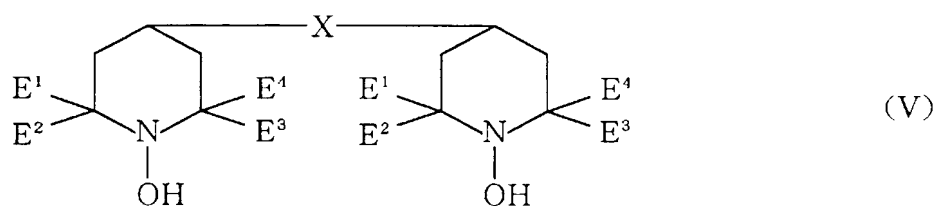


tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are independently an organic group, and X is a divalent linking group.

- 5            19. The polymerization-inhibiting method according to Claim 16, wherein the sterically hindered hydroxylamine compound is a compound represented by the formula (III):



- wherein the nitrogen atom is bonded directly to 2  
 10 tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are independently an organic group, and T is an organic group required to form a 5- or 6-membered ring, or a compound represented by the formula (V):



- 15 wherein the nitrogen atom is bonded directly to 2 tetrasubstituted carbon atoms,  $E_1$ ,  $E_2$ ,  $E_3$  and  $E_4$  are independently an organic group, and X is a divalent linking group.

20. The polymerization-inhibiting method according to Claim 15, wherein the phosphorus-containing compound (b) is at least one selected from the group consisting of phosphoric compounds, esterified products of the phosphoric compounds, alkali metal salts or ammonium salts of the phosphoric compounds, compounds obtained by introducing an ester linkage and an alkali metal salt linkage or an ammonium salt linkage into the phosphoric compounds, phosphine compounds, and hexaalkylphosphorus triamides.

21. The polymerization-inhibiting method according to Claim 15, wherein the monomer (c) is a conjugated diene.

22. The polymerization-inhibiting method according to Claim 15, wherein the compound (a) and the phosphorus-containing compound (b) are caused to coexist with an conjugated diene in a preparation process of a purified conjugated diene, comprising isolating the conjugated diene by conducting a distillation process including extractive distillation from a conjugated diene-containing hydrocarbon mixture.

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